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ABSTRACT

With growing population diversity a feature of both the work force and the schools, a study was conducted to explore what implications diversity has for school preparation. Data from a national longitudinal study of students enrolled in both secondary and postsecondary programs featuring emerging vocationalism (programs featuring tech prep, integrated academic-vocational learning, or career academies) were used to describe the students' perspectives and experiences as they enter, participate, and graduate from these programs. A modified grounded theory approach was used in the research. A representative sample of 82 students enrolled in 5 secondary programs representing different curriculum orientations (business, manufacturing, science and technology), location, size, and students with different backgrounds identified several aspects of school climate that were important: a supportive environment, exposure and access to a variety of curriculum opportunities, a conducive environment, and high expectations for students and teachers. Such schools create a sense of ownership and belonging while providing a challenging and interesting curriculum. Such schools can be expected to meet the needs of an increasingly diverse population. (Descriptions of the five study sites and 20 references are included in the report). (KC)

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Voices of Diversity in Emerging Vocationalism: Students' perspectives on School Climate

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As America's students and future work force become increasingly diverse in ethnicity, family, culture, and economic background, the challenges they present to employers, educators, and vocational educators, in particular, are not well understood. The rapid increases in both the scope and magnitude of diversity present enormous implications for preparing these individuals for productive employment in today's learning-intensive and technology-intensive work place. This paper presents preliminary findings of a national longitudinal study of students enrolled in both secondary and postsecondary programs featuring emerging vocationalism (e.g., programs featuring Tech Prep, integrated academic-vocational learning, career academies). The purpose of the study is to describe the students' perspectives and experiences as they enter, participate, and graduate from these programs. Based on a modified grounded theory approach to research, school climate emerged as an important aspect of these programs. The findings presented on this document focus exclusively on the experiences and perspectives of students enrolled in five secondary programs representing different curriculum orientation (e.g., business, manufacturing, science and technology), location, size, and students with different backgrounds.

Numerous policy analyses have noted that one of the most significant challenges confronting U.S. public policy is the rapidly growing diversity of our nation's population (Pallas, Natriello, & McDill, 1989; Ward & Anthony, 1992). As Levin (1989) noted, failure to anticipate the coming changes in the composition of the student population and to plan appropriate responses will leave us not with the same educational problems we face today, but perhaps with problems so severe and widespread as to threaten our economic welfare and even our social political stability. During the 80's, a number of educational reform initiatives were advocated to provide a more effective education for the "lowest third" of our students who are at-risk, but failed to produce academic gains for this segment of the student population, reduce youth poverty or increase high school graduation rates (Hodgkinson, 1989). In response to these challenges, over the last few years, educational reform has included a comprehensive efforts to expand and improve curriculum opportunities for <u>all</u> students as opposed to just some particular groups. Presently, educators, administrators, researchers, and policy makers are engaged in developing state plans and implementing calls for reforms derived from the Perkins Act Amendments of 1990 and the School-to-Work Opportunities Act of 1994. As this push for educational reform continues, there is an ongoing debate about the value and lasting impact of these reforms. Missing from both sides of the

debate, however, is student-level information describing the impact of these reforms on learning experiences and transitional experiences upon graduation from high school.

While youth and adults are the central focus of vocational-technical education programs, we have relatively little information from students describing and evaluating how they came to enter programs or their perspectives on what is occurring in schools and post-secondary institutions. As the field enters a new era of education and workplace reform, it is essential that the influence of these initiatives be viewed and examined from the students' perspective (e.g., motivation, intent, parental influences, expectations; the diffusion or persistence of social stigmas; and the efficacy of specific curricula, alternative teaching approaches, and education and work linkages in programs). Development of more complete understandings of the personal experiences encountered in education and work (separately and interactively) is crucial to an understanding of how students make decisions to enter education for work programs. Further, how students from different genders and ethnic backgrounds differentially experience vocational education is also central to understanding the impact of policies and practices on overcoming barriers to full participation in the economy.

Longitudinal studies such as the National Education Longitudinal Study of 1988 (NCES, 1990) are generally useful for addressing policy issues and raising significant questions regarding at-risk and other students, but they do not offer specific, student-level insights. To bring full meaning and understanding to educational reform and improvement initiatives such as Tech Prep and Integration, students' writings and assessments are an invaluable source of information. Further, most longitudinal studies do not provide opportunities to examine older adult populations and their decisions relative to education during or following extended participation in the work force.

The purpose of this study is to build an understanding of the character of experiences acquired by students through programs which represent "emerging vocationalism", with particular emphasis on the experiences of students who are traditionally under-represented in such programs. This is an ongoing longitudinal project that is examining the experiences of 133 vocational-technical students over a 3 1/2 year period. This research is providing rich information to better understand the actual impact of emerging vocational programs on participants, how they came to enter programs, and their perspectives on learning

experiences occurring in high schools and post-secondary institutions. The preliminary findings discussed in this document focus on secondary students enrolled in five programs located in major regions of the nation: northeast, midwest, south, and west (see Appendix A).

Research Approach

The study is based on a modified grounded theory approach to research. The research is grounded in: (1) programs featuring key aspects of "emerging vocationalism," and (2) the experiences and perspectives of students with different backgrounds enrolled in these emerging vocational programs across the country. We use this theoretical framework to position ourselves, the research participants, and the readers when discussing the study design, data collection and analysis procedures. .

The concept of "emerging vocationalism" has evolved within the context of an educational movement promoted by the passing of the Perkins Act Amendments of 1990. This movement places an emphasis on academic as well as occupational skills and calls for the involvement of "all segments of the population." In short, emerging vocationalism could be described by three core components: (1) integration of academic and vocational education; (2) integration of secondary and postsecondary education; and (3) developing closer linkages between school and work (Hayward & Benson, 1993; Phelps, 1992; Rosenstock, 1991). A number of key elements have been further identified by the National Center for Research in Vocational Education for each of these three core components (NCRVE Agenda, 1993, 2-3). This framework for emerging vocationalism is used in this project to focus the students' experiences and to make sense of their perspectives using the program context as a point of reference.

Further, to capture the students' perspectives the design of the project is predicated on "grounded theory". Generally, grounded theory is discovered or generated inductively from the intense study of empirical data and information. For example, theories regarding school climate were derived from the information collected on how these representative students experience schooling in certain vocational-technical programs. As Strauss and Corbin (1990) suggested: "A grounded theory is one inductively derived from the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis..." (p. 23).

In this paradigm, one does not begin with theory and seek to verify or improve it. Rather, a topic of interest is selected for study and what is relevant to the topic is allowed to emerge without preconceived notions about the nature or structure of the theoretical knowledge. This approach provides an appropriate framework for understanding student voices and experiences. Further, grounded theory allows for the generation of an integrated theory which evolves from the data in meaningful patterns which can be subject of further testing (Glaser & Strauss, 1967; Strauss & Corbin, 1990). Derived from this research approach, a preliminary analysis of the data has clearly indicated school climate, student aspirations, and knowledge production are important indicators of the students' experiences in emerging vocationalism. For the purpose of this paper, only school climate will be discussed.

School Climate

Over the last two decades, much attention has been given to the effects of school characteristics on student achievement. School climate, in particular, defined as the environmental characteristics affecting teaching and learning has become a key theoretical construct. School climate has also been defined as a combination of subjective and objective indicators which represent the overall impression one gets about a school (Ellis, 1988). For instance, Roueche and Baker (1986), defined school climate as the overall environment, values, shared beliefs, and personality of the school. Literature on effective schools indicates that various factors of school climate (e.g. the presence of school spirit, discipline and order in the school, supportive environment, safety concerns) play a role in increasing the effectiveness of the school in providing a positive place where learning can take place (NCES, 1990; Paredes, 1991; Wardlow, Swanson, & Migler, 1992). Further, in a recent study, school climate was one of six theoretical constructs considered to be critical influences on student learning (Wang, Haertel, & Walberg, 1993). Other constructs included student characteristics, classroom practices, home and community educational contexts, design and delivery of curriculum and instruction, school governance and organization, high expectations and high instructional goals of teachers (Druian & Butler, 1987). Indeed, the critical role of school climate appears to be as an indirect determinant of student learning through positive interactions between teachers and students, safe school environment, encouragement of critical thinking and

creativity, acceptance of diversity and pluralism, and appreciation of learning opportunities (Wang, Haertel, & Walberg, 1993; Wardlow, et al., 1992).

What does this all mean for students in emerging vocational programs though? It has been argued elsewhere that school climate consists of four dimensions (Smey-Richman, 1991; Wardlow, et al., 1992). These include ecology (e.g., building characteristics, size), milieu (teacher and student characteristics), culture (school values and perceptions), and social system (interaction between teachers and students, school support). It has been also suggested that of these, variables of school culture and social systems are more influential on students' learning (Smey-Richman, 1991). In our study, the importance of school climate clearly emerged within and across programs following a grounded theory approach to research.

Method

Study Design

The project design was revised considering the input from a research advisory group, review of relevant literature, feedback from personal consultations with NCRVE staff, and focus groups completed with students and staff involved in programs with potential for participation in the study. Based on this input, the concept of "emerging vocationalism" was further characterized with a set of indicators to provide specific examples for each of the three core components mentioned above. Further, four major research questions were reviewed and refined: (1) What are the reasons students enroll in these programs?; (2) What kinds of learning experiences students are exposed to?; (3) What are the students' perspectives on these learning experiences?; and (4) What are the student's expectations and experiences upon graduation?

To frame the students' learning experiences within programs of emerging vocationalism, we used a multicase study approach and selected 5 secondary programs (cases) and a representative sample of 82 students. Fifty-four programs (33 secondary, 21 postsecondary) were screened based on descriptions found in recent national publications, program brochures, or provided via direct contact over the phone and/or nominations from persons knowledgeable of the program(s). We used a rating system to determine whether practices related to the indicators were present or not. Selected sites are located in

major geographical areas of the country (south, northeast, midwest, and west) and represent rural, urban, and suburban communities. Since it was practically impossible to include every variable of selection to develop a "fully crossed" design, we selected programs based on indicators characterizing each of the three core components of emerging vocationalism. Overviews of the programs are presented in Appendix A.

Student Selection

In 1993, participants were selected from two cohorts within each program, beginners (freshman and sophomore) and completers (juniors and seniors). Main criteria for student selection along with school status included gender, ethnicity, socioeconomic background, and disabilities. The sampling strategy was based on a demographic profile using data from the National Education Longitudinal Study of 1988, first follow-up study conducted in 1990; and data from the National Assessment of Educational Progress of 1990. These two national studies indicated a proportional participation by gender and low participation of certain ethnic groups. Thus, under-represented groups were over-sampled to include a more representative voice in this study. To date, overall student participation by gender in the secondary cohort is 61% male and 39% female students. Participation by ethnicity is as follows: 34% African-American, 7% Asian, 23% Hispanic, 3% Native American, and 38% White students.

Random identification of students was problematic because of different regulations in the schools and our own time limitations. Thus, to select students, project staff contacted a program liaison at each site and we provided them with a package describing our study. We asked these persons to facilitate the identification of a pool of 25-30 students with the characteristics described above. Once access was granted, we visited the programs and met with the pool of 25-30 students identified by contact persons. We explained our study to the group and did a quasi-random selection of 10-15 students from those who volunteered participation.

Data Collection

Instruments and procedures for data collection were pilot tested in two sites not included in the study. Prior to each interview, we have explained to the participants our research interest and assured the confidentiality of all information. With the permission of the interviewees, all interviews have been tape

recorded and complementary notes have been taken. In addition, class observations have been also conducted in regular academic courses (e.g., English, math) and program-specific courses (e.g., computer aided drafting, agricultural leadership).

Following each site visit we summarized the interviews and developed a brief description of the school and the program using personal notes and print materials collected at each institution. The first round of site visits began by mid-November, 1993, and continued through December, 1993. A second round of interviews was completed in 1994 and four more site visits are scheduled for the 1995-96 period. The preliminary findings presented here derived from the analysis of the first round of site visits.

Analysis

The analysis followed an inductive grounded theory approach to guide our analysis. This is a systematic comparative method which integrates data collection, identification of themes, and analysis with grounded theory. Two major components characterize the systematic comparative method (see Glaser & Strauss, pp 105-111): the analytical steps and analytical guiding questions. Our analytical steps included the following: (1) Comparison of critical experiences or events within broad categories; (2) characterization of each category; (3) verification of theoretical properties; and (4) theory integration.

To guide our analysis, one question was central to our data analysis: What is the nature and character of the students' learning experiences in programs representing emerging vocationalism? To characterize our findings derived from this question we further addressed a sub-set of analytical guiding questions: (1) What are the learning experiences or events deemed important across interviews and programs?; (2) how do students describe these experiences or events?; and (3) what are the students' evaluation of such experiences or events?

During the first step of the comparative method project staff shared with each other our personal and academic background to "position" ourselves in our data analysis and integration of theory. The second step involved the review of interviews on an individual basis using interview transcripts and having at least two staff reviewing and coding each interview. Based on our guiding questions we identified experiences and incidents which integrated categories of emerging themes. We used this "open" technique of the comparative method, across interviews and across programs to find consistency in at

least half of the participants within each site, and at least three of the five secondary programs. During the third step of the analysis, we further refined our indicators and continued testing the emerging theory. At this point, we first tried to test emerging indicators of categories across participants within each program against our rule of having evidence from at least half of the interviewees. Secondly, we tested our theory across programs against our rule of finding consistency in at least three of the five secondary programs. Through constant exchange during staff meetings we reached a point at which we all became satisfied with the consistency and validity of the indicators identified for each category.

Results and Discussion

Students' experiences and perspectives on school climate and aspirations are presented on this document. These are preliminary findings on students enrolled in five secondary programs located across the nation representing different geographical location, urbanicity, and students with different backgrounds. Findings are presented first for each theme and corresponding properties as they emerged from the analysis of research material. This section will be followed by a discussion which integrates students' perspectives into both the contextual dimension of emerging vocational programs and the extant body of knowledge.

Students' Perspectives on School Climate

School climate in emerging vocational programs is defined for the purpose of this paper---based on the studdents' perspectives---by supportive environment, access to a variety of curriculum opportunities, conducive environment, and a culture of high expectations. These characteristics of school climate emerged from the analysis as important features of the school which seem to have an impact on the students' learning experiences.

Supportive Environment. "Supportive environment" is a feature of the school climate that students described as being influenced by support from teachers, counselors, peers, mentors and established school services. Teachers and counselors in all the programs were perceived by students as helpful, understanding, supportive, compromising, nice, and friendly. Students consistently described the support received from teachers as essential in fulfilling the expectations of the rigorous curriculum that is present in these programs:

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them anytime.... and I could go to teachers anytime and my counselor downstairs Mr. Conrad." *Asian, male—Business Program.*

Exposure and Access to a Variety of Curriculum Opportunities. This feature of school climate emerged as another element of the school climate that characterizes how students experience these programs. This is described as curriculum opportunities which may not be available at a different school such as career exploration, and variety of choice. Further, derived from these perspectives, students were able to identify connections of current learning experiences to future work and learning experiences. Thus, students throughout these programs consistently described how curriculum components created an environment that influenced their learning experiences.

Career exploration through the integration of academic and vocational curriculums was discussed by students as influencing their experiences. Students are provided with opportunities to explore career clusters through a variety of occupational and academic offerings. For example, one student observed that:

> "...in the business program it may start off a little slow but it's got good fields to teach you--- accounting, business law, computers, how to type a resume. It's got programs where you can go to a bank and you can learn things about the bank. They have many clubs that even teach about banking and stuff like that." *Hispanic, male—Business Program.*

Further, choice in the curriculum was described by the students as offering a variety of courses which they knew were not available at other high schools. Choice in the curriculum appears to foster in students a sense of control over their learning—as one student said it— which may suggest they feel more connected to their learning:

> "It's excellent so far, it has a lot of variety of classes. If you don't like a certain business class you always have an option to go to another business class. The teachers have a business background mostly every teacher at this school. And the classes—there's not only accounting, there's four or five accounting classes!" *Asian, male—Business Program.*

It appears career exploration and choice, as components of the curricula, provided students with opportunities to make connections between current learning and perspectives on future work and learning. This is reflected by a student in one of the magnet schools:

> "I just think that being in this kind of school I can better myself as an individual. You round yourself out more cause there's so many different little topics, especially electronics. Like some of the things already that I've gotten here I never even heard about before. And this is our freshman year. For example, I've never done any kind of bio-technology class like that before. We're already involved in learning and applying advanced biotechnology in the

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laboratory—some people don't do this until like their first year in college so that shows how accelerate this program is." *White, male---Science and Technology Program.*

Conducive Environment. A conducive environment for learning emerged as providing exposure to diversity, a non-threatening atmosphere (safety), and personalized attention. These three elements were described as defining characteristics of conducive environment when students reflected on their experiences. For instance, students enrolled in two programs where the student population is diverse discussed how this element of the environment contributes to their learning. The two programs have a broad occupational focus on technical arts and business. The students indicated that the exposure to different "cultures," and "backgrounds" would prepare them to function more productively in the real world by providing them with personal understandings of these differences. As one student put it:

> "But when I got here I saw all this mix of races and at first it seemed a little odd how they actually lived together. I'm a new student and I see that most people including those from last year got along fine. It attracted me to that sense of feeling here and so I sort of went with it. And it feels good you know trying to get along with other people even though there's so many problems around." *Hispanic, male--Business Program.*

Another crucial element of the conducive environment was safety, described as a non-threatening atmosphere. Students described the environment as less aggressive than in other school that they had attended. Students expressed that the absence of violence in the school climate allowed them to enjoy their participation in the program:

> "And it's just a complete learning environment since I've been here I've never seen a fight. I came from you know a public school where we have them and [my previous] wasn't exactly your best school. So we had fights and a lot of conflict. There's none of that, everyone is here for one thing. That's so hard to find in a high school I think cause other stuff gets involved and the learning aspect gets lost." *Black, female--Science Technology Program.*

Further, the majority of the students in emerging vocational programs discussed personalized attention as making the school climate conducive to learning. Some students attributed the individual attention to the size of the school and classes as being small and organized. Others spoke of the willingness of teachers to spend extra time assisting students on personal and academic problems. The size and structure of the environment is characterized by students as allowing them to have individual time with teachers and to assume responsibility for the character of their learning experiences:

> "I learned a lot of things in this program because it just helps you to elevate your thinking to a high level so that you can understand better. And hopefully, it'll get even higher as I go along." *Black, male--Business Program.*

High Expectations for Students and Teachers. Students described this category as high academic standards, rigorous work load, and in-depth instruction. Expectations for students in these programs were viewed as different from the expectations they had encountered in previous learning environments even by high achieving students. Students talked about how the climate of high expectations created competition and a desire to achieve at levels higher than before:

> "I figured to go here I would have to organize more, because basically I'm not a very organized person. I was like you just have to learn how to sharpen up when you're here. It's not as easy. Everything back in middle school and through elementary school like being gifted everything comes so easy and when you get to [this program] it's a reality check. For the first time in your life you have to really study and you have to really work." *Black, female--Science Technology Program.*

Further, students appear to develop high expectations from teachers and coordinators in response to the academic rigor. In most programs, teachers push them to improve academically regardless of current academic level. Students feel that the standards in these programs are higher than other schools and programs:

> "[This school] has more academic standards than any other school. I know for a fact, we have higher standards than at a couple of the other [area] schools. A lot of teachers will go ahead and get you out of there. Okay you can pass with a B. You're gone, bye. I don't have to see you anymore. They don't do that here. If you make it, you make it." *Hispanic, female--Manufacturing Program.*

Students also feel that high expectations are reflected in the nature of the demanding workload of these programs. However, students are able to connect additional learning experiences to broad implications for future work and academic applications. As one student observed:

> "In your freshman year you end up [in a program like this which] is very demanding, you're going to have to learn how to budget your time. That's something that we have to learn out on our own. There is so much to do and learn that sometimes you just get swamped with work and you have to know what you can do---and when--- and just to get by what to do the next day. Hopefully, those experiences will help you when you get into college and to decide what to specialize in." *Black, female--Science Technology Program.*

Finally, students discussed experiencing high expectations in the school climate through in-depth instruction and learning. Students described this characteristic of school climate as providing them with a better understanding of content in the curriculum. This perspective can be best summarized by the following student account:

"In my freshman year the student population was around seven hundred and the student-teacher ratio was really small. So that makes an individual learn more things and ask more questions when I don't understand a problem. And I said to myself if I want to actually learn something at school you need personal attention..." *Hispanic, male—Business Program.*

Conclusions and Implications

In conclusion, a preliminary analysis of interview material clearly indicated school climate is a critical indicators of the students' experience in emerging vocationalism. Given the current focus on effective schools, it appears that school climate is one feature of emerging vocational programs that holds important implications for serving all students effectively. Understanding student-level experiences can inform the implementation of future school-to-work programs throughout the nation.

Further, findings on school climate are consistent with extant theory on this construct (Smey-Richman, 1991; Wardlow, Swanson, & Migler, 1992). For instance, the NELS:88 data supports some of the findings of this research regarding school climate and confirm the need to: offer a climate where learning is valued, where teachers know their students well and have high expectations for all students, a rigorous core academic program is in place in alignment with flexible instructional strategies that can serve a diverse body of students (NCES, 1990).

In our study, both "supportive environment" and the "expanded educational and occupational opportunities" embedded in the school climate came up consistently within and across programs. This is an indication that once students enroll in emerging vocational programs, a supportive environment is in place to help students adjust to a rigorous and new curriculum orientation. Some schools have some original ways to provide a network of support (e.g., "impact groups", "buddy" program), but in most instances it is the positive attitude and availability of teachers, counselors, and administrators which makes a difference in the students' lives. Further, the role and attitude of teachers and counselors, appear to add greatly to a positive supportive environment in the school. In addition, peer participation to provide personal and academic support may help create a sense of ownership, belonging, and community.

The orientation of the school, on the other hand, appears to create an environment that promotes the development of a culture with notions of valued and important potential educational and occupational opportunities. One school, for example, provides for a wide range of educational opportunities, stresses high academic standards, and points to college upon graduation. A program with a different orientation,

on the other hand, stresses work-based learning opportunities, emphasizes preparation toward a broad occupational field and further education, and increases the chances of job opportunities upon high school graduation. In both instances, in spite of differences in school orientation, students share a culture of awareness about educational and occupational opportunities that are available to them in the future. Students seem to understand the challenges presented by these opportunities, their potential impact in their lives, and the role of further education during and after the transition from high school to college or an occupation.

Emerging vocational programs appear to function in a school climate full of promises, expectations, and dilemmas. The promises are in the form of educational and occupational opportunities to be delivered in a nurturing and supportive environment. The expectations come in the form of rigorous curricula and high standards for both the teachers and students. The dilemmas lie in trying to keep a balance between a demanding and supportive environment, between a career and a college orientation, and between applied and traditional ways of learning, which in many ways are deeply embedded in the school culture.

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Site A

This is a comprehensive magnet high school serving 478 students in grades 9 through 12. Students attending the school are generally characterized as outgoing and ambitious. As in many urban high schools, diversity is common in race and in socioeconomic status. Specific selection criteria, however, is used to maintain 50% enrollments by gender and a minimum of 15% Caucasian enrollment (see box on student enrollment).

Student Enrollment
(Fall 1993)

Male	**50%**
Female	**50%**
Caucasian	**15%**
African-American	**85%**

Created in 1985, the school offers science, business, and technology with focus on agriculture in a variety of collegiate and career-bound formats. The school is located on a 72-acre plot in a large metropolitan area in the Midwest. On this site students simulate and actually realize the pursuits of agriculture. This objective is operationalized in arboretum management, pond management, test plots, nature trails, and crop breeding situations.

Students indicated the curriculum of the school is very demanding. Due to it's elective nature, as a magnet school, academic rigor appears accelerated as compared to traditional high schools of similar size and demographics. Extensive curricular opportunities exist in horticultural sciences, food sciences, agricultural careers and leadership, and agribusiness. The introductory courses are similar for all students and the junior and senior courses are based upon student preferences.

Opportunities to experience authentic learning are provided in many ways at this integrated vocational and academic campus. Students hypothesize outcomes, gather and analyze data, and report their findings. Further, internship experiences are available for students at the city's board of trade and the state university.

"I think it's real learning when I'm conducting research. I love to complete the experiments, finding out new things. When I get the results it's always great to see that what I've done goes along with what the paper says or what the tests show!"

Senior student

The high school is a noteworthy magnet school. It's awards and accreditation are strewn throughout the overcrowded campus. The accomplishments of students encourage others to succeed. With a solid extracurricular participation rate of 100%, the students enjoy a variety of school day and after school activities which make this school a community.

The school has a "new employability" competency focus. Students use SCANS competencies in their courses and are assembled into teams for competitions relative to the agriculture industry. Beyond this, the global marketplace focus allows students to compare the marketability of products in three different countries and economies.

Site B

This urban magnet high school began in late 1981 as a partnership effort between the school district, business community and local government. In 1991, the school added a fashion component to its curriculum with the support of fashion industries and local trade college programs. This high school, located in the downtown area of a major city in the West coast, affords students the opportunity to experience an open classroom and business-like environment.

Admission to this school follows the general procedures for admission to all magnet schools in this district. Students apply and submit their applications to the district's headquarters where they are processed. Today, 865 students are enrolled . Eighty-six percent or 750 of the total student population participate in the business component. The remaining 115 students enrolled are in the fashion component. Over half of the students enrolled come from low, socioeconomic backgrounds (see box on program enrollment).

Student Enrollment
(Spring 1994)

Total	**865**
Business component	**750**
Fashion component	**115**
Asian	**9%**
African-American	**45%**
Caucasian	**9%**
Filipino	**2%**
Hispanic	**35%**
Native American	**3%**

The school's business and fashion programs work in cooperation with the city area chamber of commerce, the local school in business industry, and the fashion institute to provide the students with advanced, challenging study in their selected field. The business program of study offers students a general education component and an advanced curriculum in business including work-based learning opportunities. The advanced component includes a specialized program known as the Academy of Finance. This is an option to students who want in depth economic knowledge drawing from expertise of professionals in the business community.

Authentic learning activities are emphasized through class projects (e.g., economics, fashion design, accounting), which require the investigation of a topic, implementation of the project, and report writing/oral presentation of findings. Furthermore, applied academics is integrated in the business and fashion components using practical applications related to the business world. Reading and writing skills are stressed across the basic academic coursework and business/fashion related courses. Additionally, all students take an introductory class in computers designed to furnish them with basic user skills in word processing, data base and spreadsheets. Also available to the students are beginning and advanced Pascal computer programming classes.

"I learn a lot of stuff out of this program because it just helps you to elevate your thinking to a higher level so that you can understand better...and hopefully I'll get even higher as I go along."

Asian female student

Internship programs are also available to students. Student selection for the internships is based on academic achievement, faculty recommendations, and demonstrated performance and responsibility. Students studying fashion will be placed as interns in the fashion community after completion of basic coursework. The school also offers certificate programs in Clerical/Office, Sales/Merchandising and Accounting.

Site C

This program is characterized by a school culture receptive to change and not being afraid of experimenting with innovative approaches to education. The program in Technical Arts is one of seven at the host school, the only public school in this metropolitan area located in the Northeast. Restructured in 1991, the program is serving students in grades 9-12 and offering technical programs in the following areas: automotive, auto body, baking, carpentry, culinary arts, computer science, drafting and design, electrical, electronics, and graphic arts. The focus is on basic transferable skills leading to career and college opportunities. In 1993 the school reported an overall student population of 2026 students representing 64 countries and 18 languages. Students in the program appear to be from low to middle socioeconomic backgrounds (see box for enrollment in the Technical Arts program).

Program Enrollment, Fall 1993

Total	**225**
Male	**75.0%**
Female	**25.0%**
Asian	**1.5%**
African American	**32.0%**
Hispanic	**19.0%**
Native American	**.5%**
White	**47.0%**

During the 9th grade students participate in various program components called City Life, City Systems, and City Works. During the 10th grade, students take two other basic components of the program, Humanities and Industries. During the 11th and 12th grades, students choose a major and are able to take elective classes and enroll in internship programs to satisfy their own particular interests. New additions to the program include courses such as The Craft of Science in which students learn principles of physics, and Science for Health Careers to prepare students interested in health professions.

Using the city as a laboratory and various wokplace environments, students are provided with opportunities to apply basic and advanced skills. Classes such as English and Social Studies, and American Studies and Language Arts, are integrated (team taught). Teamwork, problem-solving, communication skills, creative thinking, and the use of personal initiative are all emphasized across program components (e.g., City Works and Industries). Multicultural awareness is also developed through the daily interaction of students with different ethnic backgrounds and cultures. The program also provides academic and personal support services for all students such as counseling and tutorial services.

There are various opportunities available for interested students to either take advanced classes during the summer or participate in internship programs at nearby colleges and universities. Students have the opportunity to strengthen or develop career and college plans through these experiences. Internships are available in physics facilities management, education, technical fields, and health for juniors and seniors. Concurrently, the program works closely with local corporations, hospitals, and higher education institutions to provide for paid work-based experiences. The program also supports a cafeteria in the culinary arts for instructional purposes. Integration of education and work is emphasized across all the technical components of the program and services. Any products made in the shops are marketed in the community whenever possible (e.g, selling furniture to raise money for the carpentry shop, students making and selling furniture on their own, repairing electronic equipment).

Site D

The manufacturing youth apprenticeship program began in September 1992 and is housed in a high school located in the a predominantly middle class suburban town. This is a two-county program supported by a consortium of 16 local manufacturing companies and seven high schools. There are currently 38 students enrolled in the program. Of these students, 30 are enrolled in the host high school while the rest come from other high schools. In terms of gender there are 31 males and 7 females. The majority of the students are Caucasian (36) and only two Hispanic students participate in the program. There are no identifiable students with disabilities, low socioeconomic background, or low English proficiency enrolled in the program.

Prospective students receive letters from program coordinator indicating their eligibility for the program. Participant companies are actively involved in the recruitment program and help orient students through the selection process. Interested students are interviewed by personnel from participant companies who make the final selection of participant students based on academic performance, school attendance, and interest in manufacturing industries. Once in the program, students attend the Manufacturing Academic housed in a local company which agreed to provide the necessary space to hold instruction sessions and training equipment. Tools and machines were donated by six metal-working companies. Here, students spend two hours a day on hands-on instruction learning how to operate 30 basic tools in a factory-like environment.

Apprentices receive monetary support over a two-year period with scholarships awarded at the end of the first year based on grade point average. During the second year, senior students are involved in a cooperative plan with pay for hours of work during each school day. Students completing the program receive a certificate worth about 1,700 hours of training in the metalworking industry.

The goal of the program is that graduates will continue their education through on-the-job training or in college programs. Students may go on to a 4-year college or enroll in the local two-year technical college and earn an associate degree in applied science. Students who choose the latter career path may work full-time at one of the sponsor companies and attend school part-time with financial support from the company if pre-set grades are maintained. To this end, the program is articulated with a local technical college and use of advanced or dual credits is possible. This way, training hours in the high school count toward the 8,000 hours needed to earn a Journey Person's Card and for two credits toward an associate degree.

Curriculum materials used in the program were developed by industry and school personnel to stress practical applications in the manufacturing industry. Further, apprentices complement their preparation through participation in the cooperative program in the senior year. The cooperative program is designed to provide vocational guidance and training through a combination of school-based instruction and part-time employment in an approved job training position. In the cooperative program, students are exposed to the real work environment, updated equipment, daily operations and problems, and interactions with co-workers.

The focus of the program is reflected in the context of teaching. This is more obvious in math and computer coursework where practical applications to manufacturing processes are more easily related. Further, students use math and geometry to solve practical problems and work with angles. Computer use is also emphasized to draw and design parts and work on blueprints.

Site E

This suburban magnet high school focuses on science and technology and offers a full-time program for students in grades 9-12. Its mission is to provide a rigorous college preparatory program to students with an aptitude and interest in the sciences and technology, and to stimulate cooperation among the surrounding academic, scientific, and business communities. Students are accepted based on a variety of criteria, including admission test scores, overall academic achievement, personal essays, teacher recommendations, and self-reported interests and activities. Annually, the school receives 2,500 applications for admission but only 400 are admitted annually. Students from six surrounding school districts are eligible to attend this public school (see box below on student enrollment).

Student enrollment, Fall 199

Total	**appx. 1600**
Male	**57-60%**
Female	**40-43%**
Asian	**20%**
African-American	**6%**
Caucasian	**68%**
Hispanic	**6%**

In partnership with business, industry, and governmental agencies, eleven specialized technology laboratories support the scientific research emphasis of the curriculum. During their senior year, students can elect to work with community-based mentors to complete their senior science research graduation requirement. Many of these companies and research firms provide summer and year-round employment for students, as well as financial assistance for tuition at post-secondary institutions. Students in mentorships are completing projects such as the following: Preparing a digital terrain model (Computer-Aided Design), the expression of UV damaged-specific DNA binding protein in UV-irradiated human cells (Biotechnology), generation of design parameters for advanced satellite designs (Microelectronics and Telecommunications).

Technology is emphasized as a way of thinking about processes which extend human needs, as well as on the content and equipment relative to technology. For instance, the Freshman students complete a block-scheduled core course in Biology, English, and an introductory Technology course which includes working in teams to complete seven or eight projects. These projects/problems build on and link knowledge across several disciplines. Further, the 8th period Activity Session gives students an opportunity to choose between various extracurricular activities, including tutoring; peer counseling; academic, technical, scientific clubs; chess and computer clubs; and various personal support groups. Both instructors and counselors participate actively in the 8th period Activity Session assisting students with their studies. Data on graduates from a recent survey indicates that 75% of the graduates completed a college degree in science and technology, mathematics and computer science.

The learning environment at the school contains multiple representations of the culture and values which surround the school. Art work and posters are everywhere. Students also produce two journals annually which are refereed by students and feature students' artwork, photography, science and technology investigations, and personal essays. To broaden access to science and technology education generally, the school hosts a number of professional development activities for math, science, and technology instructors from throughout the region, the state, and nation each year. During the summers enrichment-oriented Technology Institutes are available to 8th grade students who will not be attending the school.